

IN THE CLAIMS:

Please amend claims 1, 2, 6, 14-18, and 21-29 as indicated below.

A listing of the status of all claims 1-29 in the present patent application is provided below.

1. (Currently Amended) A storage management system for backing up ~~digital content of~~ a storage system comprising a plurality of units of storage, ~~wherein~~ the storage management system ~~emprises~~comprising:

at least one ~~data~~ current store representing a current state of the storage system; and

at least one time store;

wherein the storage management system automatically ~~interecepts~~ records information associated with all write commands issued directed to the plurality of units of storage, each write command comprising an instruction to overwrite at least one of the plurality of units ~~unit~~ of storage with new data;

wherein the storage management system copies, prior to ~~execution of each write command~~ overwriting the at least one unit of storage, old data present at the at least one unit of

storage into the at least one ~~data~~ time store, wherein ~~a record~~
~~of~~ the old data is timestamped, thereby continuously indexing by
timestamp old data to be overwritten with new data prior to
execution of each write command storing backup data that
~~correspond to a time period uninterrupted by any pre-existing~~
~~volume-level snapshot of the plurality of units of storage; and~~

wherein the storage management system is further configured
to identify ~~historic-old~~ data that were present in a specified
portion of the plurality of units of storage during ~~the a~~
specified time period prior to being overwritten based at least
in part on the ~~backup data timestamp, the identification~~
~~identifying less than a pre-existing volume-level snapshot of~~
~~the storage system.~~

2. (Currently Amended) The storage management system of claim 1,
wherein the storage system further comprises one or more
physical storage devices on which data ~~the digital content~~ of
the storage system is stored.

3. (Previously Presented) The storage management system of claim
2, wherein an address for accessing the storage system comprises
a device identifier and a location identifier.

4. (Previously Presented) The storage management system of claim 3, wherein the device identifier identifies a physical storage device.
5. (Previously Presented) The storage management system of claim 3, wherein the device identifier identifies a logical device.
6. (Currently Amended) The storage management system of claim 1, wherein ~~the digital content~~ data of the storage system can be accessed by specifying an address and a time, and wherein the time specifies that the ~~digital~~ data retrieved from the address is the most recent ~~digital~~ data that was written to the address at or before the time.
7. (Previously Presented) The storage management system of claim 6, wherein the time is explicitly specified in a request to access a unit of storage.
8. (Previously Presented) The storage management system of claim 6, wherein the time is specified in a command to the storage system separate from a request to read a unit of storage.
9. (Previously Presented) The storage management system of claim

6, wherein the storage management system creates a virtual device, wherein the time is specified when the virtual device is created, and is applied when the virtual device is accessed.

10. (Previously Presented) The storage management system of claim 9, wherein new data is written to the virtual device without overwriting data that was written to the storage system after the time specified when the virtual device was created.

11. (Previously Presented) The storage management system of claim 6, wherein a command to the storage system specifies that the time is implicitly a current time.

12. (Previously Presented) The storage management system of claim 6, wherein the time is specified relative to a current time.

13. (Previously Presented) The storage management system of claim 1, wherein the units of storage are blocks.

14. (Currently Amended) A method for backing up ~~digital content~~ of a storage system having a plurality of units of storage, the method comprising:

~~intercepting~~recording, automatically, all write commands ~~issued~~ directed to the storage system, wherein each write command comprises an instruction to overwrite at least one of the plurality of units ~~unit~~ of storage with new data;

copying, prior to ~~execution of each write command~~ overwriting the at least one unit of storage, old data present at the at least one unit of storage into a data time store, wherein a record of the old data is timestamped, thereby continuously indexing by timestamp old data to be overwritten with new data prior to execution of each write command ~~storing backup data for a period of time~~; and

identifying ~~historie~~ old data that were present in a specified portion of the plurality of units of storage during ~~the period of~~ a specified time period prior to being overwritten based at least in part on the timestamp, wherein the time store is identified as the location if the data was overwritten after the specified time, and the current store is identified as the location if the data was not overwritten after the specified time. ~~backup data, the identification identifying less than the entire plurality of units of storage.~~

15. (Currently Amended) ~~The method of claim 14, wherein the address comprises a device identifier and a location identifier.~~

The method of claim 14, wherein an address for accessing the storage system comprises a device identifier and a location identifier.

16. (Currently Amended) ~~The method of claim 14, wherein specifying the time comprises implicitly specifying the time.~~
The method of claim 14, wherein data of the storage system can be accessed by specifying an address and a time, and wherein the time specifies that the data retrieved from the address is the most recent data that was written to the address at or before the time.

17. (Currently Amended) ~~The method of claim 16, wherein implicitly specifying the time comprises sending a command to the storage system to use a current time as the time.~~
The method of claim 16, wherein the time is explicitly specified in a request to access a unit of storage.

18. (Currently Amended) ~~The method of claim 14, further comprising presenting a virtual storage device for which the time is implicitly set to the specified time for all addresses of the virtual storage device.~~
The method of claim 15, wherein the storage management system creates a virtual device, wherein

the time is specified when the virtual device is created, and is applied when the virtual device is accessed.

19. (Original) The method of claim 18, further comprising writing data to the virtual storage device.

20. (Previously Presented) The method of claim 14, wherein specifying the time comprises specifying the time relative to a current time.

21. (Currently Amended) An apparatus for storing data, the apparatus comprising:

a storage appliance that interfaces with a computer;
one or more physical storage devices that interface with the storage appliance, the one or more physical storage devices having a plurality of storage units, each such physical storage device controlled by the storage appliance;

wherein the storage appliance comprises at least one current store and at least one time store, the at least one current store maintaining a current mirror copy of digital content in the one or more physical storage devices, and wherein, each time immediately before a storage unit is

overwritten by write command with new data ~~and without pre-~~
~~scheduling~~, any old data present at that storage unit is
timestamped and stored in the at least one time store, thereby
continuously indexing by timestamp old data to be overwritten
with new data prior to execution of each write command storing
~~backup data for a period of time; and~~

wherein the storage appliance is further configured to
identify ~~historic~~ old data that were present in a specified
portion of the plurality of units of storage during ~~the period~~
~~of time~~ a specified time prior to being overwritten based at
least in part on the backup data timestamp stored in the at
least one time store, wherein the time store is identified as
the location if the data was overwritten after the specified
time, and the current store is identified as the location if the
data was not overwritten after the specified time. ~~and the~~
~~current mirror copy of digital content maintained in the at~~
~~least one current store, the identification identifying less~~
~~than all of the plurality of units of storage.~~

22. (Currently Amended) ~~The apparatus of claim 21, wherein the~~
~~time specifies that the digital data retrieved from the address~~
~~is the most recent data that was written to the address at or~~
~~before the time.~~ The apparatus of claim 21, wherein data of the

storage system can be accessed by specifying an address and a time, and wherein the time specifies that the data retrieved from the address is the most recent data that was written to the address at or before the time.

23. (Currently Amended) A computer readable medium having code for causing a processor to control a storage system, the storage system comprising a plurality of units of storage, the computer readable medium comprising:

code adapted to automatically ~~intercept~~ record all write commands issued to the storage system, wherein each write command comprises an instruction to overwrite at least one of the plurality of units ~~unit~~ of storage with new data; and

code adapted to copy, prior to overwriting the at least one unit of storage ~~execution of each write command and without pre-scheduling~~, old data present at the at least one unit of storage into a data time store, wherein a record of the old data is timestamped, thereby continuously indexing by timestamp old data to be overwritten with new data prior to execution of each write command ~~storing backup data for a period of time~~; and

code adapted to identify ~~historic~~ old data that were present in a specified portion of the plurality of units of storage during a specified time period prior to being

~~overwritten the period of time~~ based at least in part on the
~~timestamp. backup data, the identification identifying less than~~
~~all of the plurality of units of storage.~~

24. (Currently Amended) ~~The computer readable medium of claim~~
~~23, wherein the storage device command is a write command and~~
~~the specified time is a current time.~~ The computer readable
medium of claim 23, wherein data of the storage system can be
accessed by specifying an address and a time, and wherein the
time specifies that the data retrieved from the address is the
most recent data that was written to the address at or before
the time.

25. (Currently Amended) ~~The computer readable medium of claim~~
~~23, wherein the storage device command is a read command and the~~
~~specified time is a past time.~~ The computer readable medium of
claim 23, wherein the time is explicitly specified in a request
to access a unit of storage.

26. (Currently Amended) The storage management system of claim
1, wherein the at least one ~~data store comprises a first data~~
~~store and a second data store, and wherein the first data~~
current store maintains a current mirror copy of ~~digital data~~

stored in the plurality of units of storage, and wherein the ~~second data~~ at least one time store contains the old data and ~~the~~ a timestamped record of the old data.

27. (Currently Amended) The storage management system of claim 26, wherein, after the old data is copied to the ~~second data~~ at least one time store, the at least one unit of storage is overwritten with the new data, and the current mirror copy in the ~~first data~~ at least one current store is updated with the new data.

28. (Currently Amended) The method of claim 14, further comprising:

maintaining, in ~~a second data~~ the current store, a current mirror copy of the ~~digital~~ content of the storage system; and

overwriting the at least one unit of storage with the new data and updating the current mirror copy in the ~~second data~~ current store with the new data, wherein the overwriting and the updating occur after the old data is copied to the ~~data~~ time store.

29. (Currently Amended) The computer readable medium of claim 23, further comprising:

code adapted to maintain, in ~~a second data~~ a current store,
a current mirror copy of the ~~digital~~ content of the storage
system; and

code adapted to overwrite the at least one unit of storage
with the new data and update the current mirror copy in the
~~second data~~ current store with the new data after the old data
is copied to the ~~data~~ time store.